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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/765,437	01/22/2001	Toshiya Suzuki	001764	9007
38834	7590	06/30/2004	EXAMINER	
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036			GUERRERO, MARIA F	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 06/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/765,437

Applicant(s)

SUZUKI, TOSHIYA

Examiner

Maria Guerrero

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-16, 19, 21-25, 27 and 29-32 is/are pending in the application.
- 4a) Of the above claim(s) 1-3, 5-14 and 21-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15, 16, 19, 25 and 27 is/are rejected.
- 7) ☒ Claim(s) 29-32 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to the Amendment and the Request for continued examination filed June 14, 2004.

Claims 4, 17-18, 20, 26, and 28 are canceled.

Claims 1-3, 5-16, 19, 21-25, 27, and 29-32 are pending.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 14, 2004 has been entered.

Election/Restrictions

3. Claims 7, 14, and 21 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 6.

Applicant's election of Species III (claims 15-20 and 25-28) in Paper No. 17 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

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Claims 1-3, 5-6, 8-13, and 22-24 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 7.

Claim Objections

4. Claims 15-16, 19, and 29-32 are objected to because of the following informalities: claims 15 and 29 recite "forming a metal nitride layer without using hydrogen-containing gas". The claims do not describe the location where the layer is being formed. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 15-16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. 6,077,450) in view of Joo (U.S. 6,342,425).

Lee teaches forming a rare metal layer above a semiconductor substrate formed with semiconductor elements, forming an insulating mask layer (silicon oxide) on the rare metal layer, patterning the rare metal layer by using the patterned insulating mask layer (col. 3, lines 10-15, 20-28). Lee teaches forming a metal nitride layer on the rare metal layer (Fig. 3a, col. 3, lines 5-12). Lee teaches terminated patterning the insulating mask before the rare metal layer is exposed and patterning the metal nitride and the

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rare metal layer by using the patterned insulating mask layer (the resist pattern is removed before patterning the metal nitride layer) (Fig. 3b-3d, col. 3, lines 10-35). Lee does not show using hydrogen-containing gas to form the metal nitride layer

Lee does not specifically show forming a dielectric film on the patterned lower electrode, forming a TEOS based silicon oxide film, and annealing the semiconductor substrate in hydrogen-containing gas. However, Joo discloses forming a dielectric film on the patterned lower electrode (Fig. 3D, col. 4, lines 20-25). Joo teaches forming a TEOS based silicon oxide film, and annealing the semiconductor substrate in hydrogen-containing gas (the thermal process inherently discloses this step) (col. 4, lines 60-67, col. 5, lines 1-5).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Lee's process by including the information provided by Joo in order to provide a process for forming a capacitor without damaging the structure during patterning.

6. Claims 25 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. 6,077,450) in view of Joo (U.S. 6,342,425) and Hasegawa et al. (U.S. 6,452,274).

Lee teaches forming a rare metal layer above a semiconductor substrate formed with semiconductor elements, forming an insulating mask layer (silicon oxide) on the rare metal layer, patterning the rare metal layer by using the patterned insulating mask layer (col. 3, lines 10-15, 20-28). Lee teaches forming a metal nitride layer on the rare metal layer (Fig. 3a, col. 3, lines 5-12). Lee teaches terminated patterning the insulating

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mask before the rare metal layer is exposed and patterning the metal nitride and the rare metal layer by using the patterned insulating mask layer (the resist pattern is removed before patterning the metal nitride layer) (Fig. 3b-3d, col. 3, lines 10-35).

Lee does not specifically show forming a dielectric film over the semiconductor substrate, forming a TEOS based silicon oxide film, and the insulating mask being a TaO layer. However, Joo discloses forming a dielectric film over the semiconductor substrate and forming a TEOS based silicon oxide film (Fig. 3D, col. 4, lines 20-25). Hasegawa et al. shows TaO being used instead of silicon oxide as a mask as conventional in the art (col. 21, lines 1-8).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Lee reference by including the information provided by Joo and Hasegawa et al. in order to provide a process for forming a capacitor without damaging the structure during patterning and having an increased etch selectivity.

Allowable Subject Matter

7. Claims 29-32 are objected to, but would be allowable if are rewritten to overcome the informalities described above.

The following is a statement of reasons for the indication of allowable subject matter: in the examiner's opinion, it would not have been obvious to a person of ordinary skill in the art at the time of the invention to combine the references in order to

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meet the limitation forming the insulating mask layer as a stack of insulating layers in combination with the rest of the limitations in the claims.

Response to Arguments

8. Applicant's arguments filed June 14, 2004 have been fully considered but they are not persuasive. Claims 15-16, 19, 25, and 27 stand rejected. The amendment to claims 15-16, 19, 25, and 27 fails to overcome the rejections because the cited references meet the claimed language.

In addition, during examination, the claims must be interpreted as broadly as their terms reasonably allow. This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. In *re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989); *MSM Investments Co. v. Carolwood Corp.*, 259 F.3d 1335, 1339-40, 59 USPQ2d 1856, 1859-60 (Fed. Cir. 2001).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

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Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. DeOrnellas et al. (U.S. 6,287,975), Hwang et al. (U.S. 6,692,648), and Ju et al. (U.S. 6,169,009) silicon nitride, titanium, titanium oxide, and titanium nitride are typical mask materials used for patterning rare metal.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 571-272-1837.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Maria Guerrero
Primary Examiner
June 28, 2004